UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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December 10, 2010

Ms. Amy Henry
TVA NEPA Compliance
Tennessee Valley Authority
400 West Summit Hill Drive, WT 11D
Knoxville, TN 37902

Subject: EPA NEPA Review Comments on TVA's DSEIS for "Sequoyah Nuclear Plant Units 1 and 2 License Renewal"; Hamilton County, TN; CEQ #20100432; ERP #TVA-A06008-TN

Dear Ms. Henry:

The U.S. Environmental Protection Agency (EPA) has reviewed the subject Tennessee Valley Authority (TVA) Draft Supplemental Environmental Impact Statement (DSEIS) in accordance with our responsibilities under Section 102(2)(C) of the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. In this DSEIS, TVA proposes to renew the operating licenses for Units 1 and 2 of the 2,400-MW Sequoyah Nuclear Plant (SQN) situated on Chickamauga Reservoir in Hamilton County, Tennessee, near the city of Soddy-Daisy. The DSEIS supplements the original 1974 TVA Final EIS (FEIS) for the construction of SQN Units 1 and 2.[1]

We appreciate that TVA visited our Atlanta offices to introduce this proposed license renewal project to us on November 18, 2010. Some observations EPA made at this meeting are incorporated in this letter. In a related matter, by letter dated November 8, 2010, EPA has also recently provided NEPA comments on TVA's Integrated Resource Plan (IRP) Draft EIS (DEIS) for generating electricity over the next 20 years. The IRP incorporates SQN as part of TVA's baseline capacity.

Background

The current 40-year terms for the SQN operating licenses will expire on September 17, 2020 for Unit 1 and on September 15, 2021 for Unit 2. If TVA decides to apply for operating license extensions to the Nuclear Regulatory Commission (NRC) to continue operating Units 1 and 2 for an additional 20 years, NRC NEPA documentation on relicensing will also be needed in addition to the current TVA NEPA document. The purpose of the present TVA supplement is to disclose the environmental impacts of the proposed SQN action and its alternatives to the public and the TVA Board of Directors (Board), and to potentially serve as a baseline for NRC's NEPA documentation should the TVA Board decide to go forward with the license renewal.

[1] We appreciate that not only the current but also the original document are available online as reference.

Alternatives

For a relicensing project, reasonable and feasible alternatives outside continuing the original project – although perhaps in an improved manner – are somewhat limited if the existing facility is still competent and operation can be safely and effectively continued. Although EPA defers to TVA and NRC regarding the safe operational life expectancy of Units 1 and 2 at SQN, decommissioning may only be necessary if there is a concern regarding safety, outdated reactor and other technology issues, or chronic operational problems at SQN.

In addition to renewing the licenses for SQN Unit 1 and 2 (Alternative 1) or to allow existing licenses to lapse and decommissioning these units (No Action: Alternative 2), the DSEIS offers alternatives for capacity replacement (in lieu of renewals) by new nuclear generation (Alt. 2a) or by new natural gas generation (Alt. 2b). Regarding these alternatives, we suggest that new nuclear generation[2] could have the advantage of assuming a more updated reactor design with passive safety features, while new natural gas generation[3] can be expected to produce more emissions than nuclear fuel but less than combusting other fossil fuels. Overall, development of new greenfield or brownfield sites for new nuclear or gas-fired units would have construction environmental impacts, whereas license renewals of the existing SQN units would have no or minimal (expansion or new spent fuel storage building by 2026) construction impacts.

TVA has identified (pg. S-4) Alternative 1 (license renewal) as its action and preferred alternative in the DSEIS.[4] To renew the two licenses appears reasonable unless there is a concern regarding safety, outdated reactor and other technology issues, or chronic operational problems at the existing SQN facility. However, if relicensing for another 20 years is pursued, we recommend that the FSEIS discuss means for improving the safety, operation, and environmental compliance/monitoring for SQN Units 1 and 2. While there may essentially not be new construction impacts (e.g., to wetlands) associated with the proposed renewal, improvements to ongoing operational protocols at SQN could conceivably result in a reduction of operational environmental impacts over the next 20-year timeframe. While we understand upgrading is an ongoing (annual) process, the proposed license renewal offers an excellent opportunity for TVA to reassess any existing impacts and mitigating them procedurally and structurally (technology components), where appropriate.

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[2] Such as the AP1000 technology being explored for potential use at the Bellefonte nuclear site (BLN) in Alabama.

[3] Such as recently evaluated at the John Sevier Fossil Plant (JSF) in Tennessee.

[4] EPA appreciates that TVA identified a preferred alternative in the DSEIS as opposed to waiting until the Final SEIS (FSEIS), since public comments can already be provided on this draft preference at the DSEIS stage.

Environmental Impacts

We offer the following summary comments on the project impacts, with more specific comments provided in the enclosed *Detailed Comments*.

* *Climate Change*: We appreciate TVA's discussion of climate change and GHGs in the DSEIS. As TVA is aware, the Council on Environmental Quality (CEQ) issued draft guidance for public comment on when and how federal agencies must consider GHG emissions and climate change in their proposed action. While this guidance is not yet final (and thus, not required), EPA recommends that the FSEIS explicitly reference the draft guidance, describe the elements of the draft guidance, and to the relevant extent, provide the assessments suggested by the guidance. We furthermore recommend a discussion of best management practices (BMPs) to reduce greenhouse gases (GHGs) and other air emissions during construction (e.g., at the proposed expanded or new waste storage area) and operation of the facility (operation of facility buildings, equipment, and vehicles). Finally, we recommend that TVA's NEPA documents related to the various TVA nuclear plants pursue and present a consistent set of information comparing and contrasting nuclear energy with other energy technologies with regard to lifecycle GHG emissions. Such a consistent presentation should evaluate and make use of all the relevant literature on this subject.

* *Air Quality*: The DSEIS suggests that other than changes to the onsite spent fuel storage and independent spent fuel storage instillation (ISFSI), no major component updates or refurbishing will be needed to extend the SQN for the 20-year renewal period. If so, we recommend that the FSEIS include a general but more definitive statement (e.g., in the abstract, summary and/or introduction) indicating that TVA believes that no substantive updates or refurbishing is needed for the proposed license renewal. Beyond this general statement, EPA requests that the FSEIS include additional information on climatological and meteorological data, the new SO_2 and NO_2 National Ambient Air Quality Standards (NAAQS), Prevention of Significant Deterioration (PSD) Class II increments, fine particulates (PM2.5) with PM10, potential Hazardous Air Pollutants (HAPs) from SQN, and fuel oil power generation with Alternative 2b. These and other informational requests are more specifically discussed in the enclosed *Detailed Comments*.

* *Environmental Justice (EJ)*: EPA appreciates – and finds it consistent with Executive Order (EO) 12898 and NEPA perspective – that EJ was considered in the DSEIS. However, results show that SQN apparently is located in a county (Hamilton) that shows a higher minority percentage (23.7%) than the State of Tennessee (19.8%), and is also the county with the highest minority percentage in the state. The FSEIS should determine what the percentage level is for the specific block group (BG) incorporating SQN to determine if it is greater or lesser than the county average. It would also be helpful to include a map depicting the population demographics for the minority clusters that were reported to exist near the SQN facility.

EPA also recommends that any existing EJ impacts – which may have occurred or are ongoing during the 40-year life of the present project licensing – be described in the FSEIS and offset as part of the prospective relicensing. Moreover, even if no existing EJ impacts exist, the proposed renewal offers an opportunity for TVA to outreach with minorities, low-income populations and other demographics living near SQN.

* *Fisheries*: TVA proposes continued use of the existing open-cycle cooling water system at SQN (with helper mode operation using the cooling towers as needed) as opposed to a closed system.[5] However, EPA is concerned that the use of an open system for power plant cooling – which constantly requires new in-take water – would entrain considerably more fish eggs and larvae (and other plankton) into the system when compared to a closed or helper mode system. The FSEIS therefore should summarize TVA's entrainment and impingement studies or estimates that reportedly show that some 90% of the entrained fish eggs and larvae are American shad. Moreover, the FSEIS should discuss if the U.S. Fish and Wildlife Service (FWS) and their state counterparts concur with TVA's study conclusions. If not, we recommend additional studies designed or approved by these agencies or consideration of using a closed-cycle system, or at least using the helper mode during spawning or other critical fishery periods. Additionally, an open system would presumably have a greater and steady thermal discharge – even if controlled by the limits of the National Pollutant Discharge Elimination System (NPDES) permit – than the occasional thermal discharge of a closed system which could also have a fisheries impact. Overall, EPA will defer to the FWS and state agencies regarding these fishery-effects and their minimization.

Summary

TVA has identified renewing the operating licenses of SQN Units 1 and 2 as its action and preferred alternative in the DSEIS. Offered alternatives to license renewal are to decommission these units (No Action) or to replace the existing SQN baseload capacity with new TVA nuclear or natural gas units. Environmentally, the decommissioning and license renewal options would offer the least environmental impact, since replacing decommissioned capacity would involve development of a new greenfield or brownfield site with its associated impacts. However, for license renewals, EPA gives deference to TVA and NRC regarding the overall risk of extending the operational life expectancy of Units 1 and 2 at SQN consistent with the operational and safety perspectives of more current designs.

For the FSEIS, EPA has requested additional information on air quality, EJ and fisheries issues, and has provided some recommendations for power plant climate change analyses. As the DSEIS appears to suggest, we recommend that the FSEIS include a general but more definitive statement indicating that TVA believes that no substantive updates or refurbishing (other than the ISFSI facility) is needed for the proposed license renewal. Moreover, even if no refurbishing may be needed, we recommend that the FSEIS discuss potential ways to improve the existing safety, operation, and

[5] The FSEIS should further discuss why TVA apparently prefers an open system at SQN from a water consumption, evaporative loss, energy use, thermal discharge, fisheries, NPDES or other perspective.

environmental compliance/monitoring at SQN Units 1 and 2 for the next 20 years beyond the ongoing annual monitoring and upgrades, since the proposed relicensing offers an excellent opportunity to do so.

EPA DSEIS Rating

We rate this DEIS as an "EC-2" (i.e., Environmental Concern, additional information requested). That is, we have environmental concerns with extending the operational life of this existing facility and are requesting additional information on how this can be achieved in a manner most productive of the environment.

EPA appreciates the opportunity to review this DSEIS. Should you have questions regarding our comments, please contact Chris Hoberg of my staff at 404/562-9619 or hoberg.chris@epa.gov.

Sincerely,

Heinz J. Mueller, Chief
NEPA Program Office
Office of Policy and Management

Enclosure: *Detailed Comments*

DETAILED COMMENTS

EPA offers the following specific comments on the DSEIS for TVA's consideration in the development of their FSEIS:

Climate Change

* CEQ Draft Guidance on GHG Analysis within NEPA – We appreciate TVA's discussion of climate change and GHGs in the DSEIS. The DSEIS indicates that the majority of the potential carbon dioxide (CO_2) emissions of the proposed relicensing of SQN would be the lifecycle contributions associated with the uranium fuel cycle (Section 3.16.1.2). The DSEIS notes that such emissions primarily result from energy needed to manufacture the nuclear fuel.

On February 18, 2010, the Council on Environmental Quality (CEQ) proposed four steps to modernize and reinvigorate NEPA. In particular, CEQ issued draft guidance for public comment on, among other issues, when and how federal agencies must consider greenhouse gas emissions and climate change in their proposed action.[6] The draft guidance explains how federal agencies should analyze the environmental impacts of GHG emissions and climate change when they describe the environmental impacts of a proposed action under NEPA. It provides practical tools for agency reporting, including a presumptive threshold of 25,000 metric tons of carbon dioxide equivalent (CO2e) emissions from the proposed action to trigger a quantitative analysis, and instructs federal agencies how to assess the effects of climate change on the proposed action and their design. The draft guidance does not apply to land and resource management actions and does not propose to regulate GHGs.

While this guidance is not yet final (and thus, not required), we recommend that the FSEIS explicitly reference the draft guidance, describe the elements of the draft guidance, and to the relevant extent, provide the assessments suggested by the guidance (we acknowledge that the DSEIS provides some of this information; however, we recommend addressing all relevant aspects of the draft CEQ guidance with explicit reference to the Draft CEQ guidance document). Based on your analysis using the draft CEQ guidance, further data collection may be necessary in the future.

EPA also recommends a discussion of BMPs to reduce GHGs and other air emissions during construction (e.g., at the new waste storage area) and operation of the facility (operation of facility buildings, equipment and vehicles). For example, clean energy options such as energy efficiency and renewable energy should be a consideration in the use of construction and maintenance equipment and vehicles. Equipment and vehicles that use conventional petroleum (e.g., diesel) should incorporate clean technologies and fuels to reduce emissions of GHGs and other pollutants, and should adhere to anti-idling policies to the extent possible. Alternate fuel vehicles (e.g., natural gas, electric) are also possibilities.

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[6] See: http://www.whitehouse.gov/administration/eop/ceq/initiatives/nepa.

* Lifecycle CO_2 Emissions (Sec. 3.16.1.2) – The discussion in Section 3.16.1.2 provides a comparison of CO_2 emissions from different types of energy production approaches. The analysis relies on information from the Department of Energy and the World Nuclear Association. Of particular interest is the value cited for indirect emissions of CO_2 associated with nuclear lifecycle emissions (i.e., 21 max to 9 min grams CO_2/kWh). A recent review by Sovacool[7] of the lifecycle GHG emissions of various energy production technologies reports, for example, a range of 1.4 to 288 g CO_2e/kWh lifecycle emissions for nuclear power, with a mean value of 66 gCO_2/kWh. The range reported in Sovocool is substantially wider and the mean substantially higher than reported in this DSEIS (note that the Sovocool paper is cited in TVA's recent draft Integrated Resource Plan dated September 2010, but not in this DSEIS).

Sovocool also points out that "...lifecycle analyses for 15 separate distributed generation and renewable energy technologies...found that all but one, solar photovoltaics (PV), emitted much less gCO_2e/kWh than the mean reported for nuclear plants." In contrast, this DSEIS implies that nuclear has lower lifecycle emissions than an array of renewable energy resources (see Table 3-25 of the DSEIS).

We recommend that TVA's NEPA documents related to the various TVA nuclear plants pursue and present a consistent set of information comparing and contrasting nuclear energy with other energy technologies with regard to lifecycle GHG emissions. Such a consistent presentation should evaluate and make use of all the relevant literature on this subject.

* Editorial Comment (Section 3.16.1.2, first paragraph) – We recommend the sentence be modified to read "Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer)."

Air Quality

* Stand-Alone SEIS: This document is reported to be a supplement to the 1974 Final Environmental Statement Sequoyah Nuclear Plant Units 1 and 2 (TVA 1974). The DSEIS refers to many other documents as can be seen in the list of references provided at the end of each section. Because the underlying basis for most of the information provided in this supplement are contained in these documents, a complete comprehensive review would have to include the information contained in these documents. The need for the underlying information and analyses is most noticed in the *Affected Environment* and *Environmental Consequences* section (Section 3) of this DSEIS. Therefore, it is suggested that all pertinent information and backup analyses needed to understand and evaluate the provided consequences of the proposed license renewal be included in the FSEIS to the extent feasible.

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[7] Sovacool, BK. Valuing the Greenhouse Gas Emissions for Nuclear Power: A Critical Survey. Energy Policy 36 (2008) 2940 - 2953.

* Electronic References: If a complete stand-alone SEIS can not be developed for this project, the FSEIS should provided the specific document, section, and page where referenced documentation and analyses can be obtained to support the information provided. If appropriate, the specific NRC docket web location should be provided. One option would be to make the supporting reference documents available in electronic format on the TVA website where the DSEIS is currently posted (http://www.tva.com/environment/reports/sqn-renewal/index.htm).

* Table S-1 Summary of the Environmental Impacts of the Action and No Action Alternatives (pg. S-13): It is suggested that the negative/positive impacts to socio-economic conditions (e.g., employment, schools, taxes, etc.) to the Sequoyah Nuclear Plant (SQN) area be considered in Alternatives 2a and 2b in this table.

* Section 2.1.1.2. Fossil Fuel Energy Sources (pg. 2-4) and Section 2.1.3. Combination of Alternative Sources (pg. 2-13): Only electrical generation using coal and natural gas were considered as reasonable alternatives to the renewal license of SQN. Higher emissions of NO_x, CO_2 and other pollutants were given as the reason fuel-oil-fired power generation was not considered. The basis for this statement (e.g., table providing representative emission rates for these pollutants by type of fuel) was not provided. It is expected that fuel oil power generation would produce emissions that would be less than or equal to those produced by coal. The basis for eliminating fuel oil as an alternative should be provided in the SEIS or this fossil fuel should be considered as an alternative.

* Section 2.2.1 Alternate 1 – SQN Units 1 and 2 License Renewal, Action Alternative (pg. 2-14): The preferred alternative of SQN license renewal does not address the possible need for facility component updates and/or refurbishing to extend plant operation for 20 more years. Any needed updates/refurbishing should be identified and their associated environmental consequences and permits/approvals should be addressed in the FSEIS. The DSEIS appears to suggest that other than changes to the onsite spent fuel storage and independent spent fuel storage instillation (ISFSI), no major component updates or refurbishing will be needed to extend the SQN for the 20-year renewal period. If so, we recommend that the FSEIS include a general but more definitive statement indicating that TVA believes that no substantive updates/refurbishing is needed for the proposed license renewal.

* Section 3.16. Climatology, Meteorology, and Air Quality (pg. 3-129) – The discussion and information provided in this section rely heavily on the analyses and information in the recent (2008) Sequoyah Nuclear Plant Updated Final Safety Analysis Report (FSAR). As noted above, it is suggested that all pertinent information and backup analyses needed to understand, compare, and evaluate the discussions and conclusions on the proposed license renewal and alternates, be included in the FSEIS.

* Section 3.16.1.1 Regional Climatology (pg. 3-129) – The following comments are associated with the information provided in this section:

- *Supplemental Climatologic Data*: The discussion of regional climatology and changes since the initial 1974 FEIS is all text. The text discussion should be supplemented with tables and figures that provide applicable wind roses, frequency distributions, comparisons etc. that would provide the underlying basis for the information provided. The tables and figures will also allow comparisons with previous observations and long-term records, and promote better understanding of the information and conclusions presented.
- *Fuel Oil CO_2 Production*: For consistency and completeness, Table 3-25 should include CO_2 production from fuel oil electric source.

* Section 3.16.1.3 Local Meteorology (pg. 3-133) – The following comments are associated with the information provided in this section:
- *Meteorological Data*: The goal of this section is to demonstrate that the initial meteorological conditions of the plant site, and engineering plant features based on these conditions, have not changed and will be appropriate for the 20-year renewal period. The addition of summary tables and figures of onsite meteorological records of comparable lengths obtained during the initial 1970s and current 2000s would be valuable for this demonstration.
- *Atmospheric Temperature*: All the important meteorological parameters for this comparison were identified except atmospheric temperature.
- *Supplemental Meteorological Data*: Similar to the previous section on *Regional Climatology*, this discussion should be supplemented with tables and figures that provide applicable wind roses, frequency distributions, comparisons, etc. that would provide the reader with a better understanding of the current meteorological conditions. The tables and figures will also allow comparisons with previous observations and long-term records, and a basis for the evaluation of subsequent dispersion and transport analyses. It is difficult to obtain this understanding from the provided text discussion.
- *Atmospheric Stability Data*: The provided table of atmospheric stability data is only associated with the most recent meteorological measurements (i.e., 2000-2009). These data should be compared to stabilities obtained from initial SQN measurements in the 1970s. Stability class frequency distributions should be used to show agreement and differences between meteorological data records. The data record comparisons of joint frequency distributions of stability, wind direction, and wind speed would be valuable.
- *Supplemental Dispersion Data*: As discussed in previous sections, the *Dispersion* section (pg. 3-137) discussion should be supplemented with tables and figures that would provide the reader with a better understanding of the initial and current dispersion and transport conditions at SQN.
- *Editorial Modifications*: On page 3-137, we suggest: (1) replacing "dilution" in the first sentence of this section with "dispersion" and (2) low atmospheric dispersion and low X/Q values are opposites so the last sentence of the first paragraph should read "Low or small X/Q values…".
- *Routine/Accident Release Records*: The routine release and accident release sections do not compare X/Q calculated values developed using initial plant meteorology with that using the most current onsite record. Only values from the Sequoyah Nuclear Plant Offsite Dose Calculation Manual (ODCM) are provided which are based on 1985-95 meteorological measurements.

* Section 3.16.2 Environmental Consequences – Climatology and Meteorology (pg. 3-140) – This section just discusses the consequences of the various alternatives on GHG production and the potential impact of climate change on the operation of SQN and other alternatives during the renewal period. It is suggested that the changes that were noted in the onsite meteorological observations since the 1970s could be used to represent what could be expected during the renewal period.

* Section 3.16.3 Affected Environment – Air Quality (pg. 3-142) – The following comments are associated with the information provided in this section:

- *New SO_2 and NO_2 NAAQS*: In addition to new and more restrictive ozone and particulate NAAQS, EPA has promulgated new SO_2 and NO_2 NAAQS in 2010. Since the facility has emissions of NO_x and SO_x, it is recommended that this section be revised to include a brief discussion of the new revised SO_2 and NO_2 NAAQS. These ambient air quality standards will have to be considered for all alternatives. These new NAAQS will be more of a permit challenge for new facilities (i.e., Alternatives 2a and 2b). The new restrictive NAAQS may be most challenging for the fossil fuel Alternative 2b.
- *PSD Class II Increments*: The permitting consequences of the PSD Class I area increments were discussed but not PSD Class II increments applicable for areas in proximity to the plants. PSD Class II increments have been promulgated for PM2.5 and it is anticipated that they will be promulgated for the new SO_2 and NO_2 NAAQS.
- *PM10/PM2.5*: PM10 is identified as a pollutant of concern throughout this section. Fine particulates (PM2.5) should be included when citing PM10.
- *Fugitive Emissions*: The discussion of fugitive particulate emissions indicates there are no sensitive receptors adversely affected by temporary generated fugitive dust and equipment exhaust. Because people and animals would qualify as such a receptor, it is suggested that this comment be modified or deleted.
- *HAPs*: This section briefly discusses the emissions of criteria air pollutants from the facility and indicates that the plant is classified as a minor source subject to the permitting requirements of the Chattanooga/Hamilton County Air Pollution Control Bureau. However, the DSEIS does not address the potential for HAP emissions from the facility. The Sequoyah Plant is listed in EPA's 2009 Toxic Release Inventory (TRI) database as having air emissions of hydrazine and lead. The emissions of these and any other HAPs should be discussed in the DSEIS.

* Section 3.16.4 Environmental Consequences – Air Quality (pg. 3-146) – The following comments are associated with the information provided in this section:

- *Natural-Gas-Fired Turbine Impacts*: The statement that the air emissions from a modern natural gas-fired turbine would be small enough that they would operate with a minor impact to air quality should be verified. We note that these facilities would have significant impacts considering the new, more restrictive PM2.5 and NO_2 NAAQS and PSD increments.
- *Alternative 2b Impacts*: The representative emissions provided in Table 3-29 for the combined-cycle operation of Alternative 2b reveals major SOx, NOx, CO, PM, and VOC emissions (note: PM2.5 emissions are not provided). It appears that "minor" would not be the appropriate classification for ambient impacts from operation of Alternative 2b natural gas-fired plants.

Environmental Justice (EJ)

* Scoping – We are pleased to note that the *Socioeconomics* section (3.13) includes EJ information, which was a scoping issue (pg. 1-28). This information is found in section 3.13.3 (*Low-Income and Minority Populations*). For clarity and easier reference, this section could have been entitled *Environmental Justice.*

* Executive Order (EO) 12898 – Page 3-100 states that "...TVA is not subject to this executive order..." The scope of the EO applies to any federal agency on the Working Group, and such other agencies as may be designated by the President, that conducts any federal program or activity that substantially affects human health or the environment. Independent agencies are requested to comply with the provisions of this EO. Therefore, we believe that independent federal agencies like TVA and EPA are subject to EO 12898. If TVA retains the conclusion that they are not subject to the EO in the FSEIS, EPA requests that TVA's rationale for not considering itself an agency subject to the EO be provided in the text or be footnoted. More substantively, however, we appreciate that some EJ information was nevertheless provided for the SQN location regardless of TVA policy.

* U.S. Census Data – Overall, Hamilton County shows a higher minority percentage (23.7%) than the state of Tennessee (19.8%), which is also the highest county in the state. The county's census categories for Blacks represent the greatest minority population difference when compared to the state average, but Asian and American Indian/Alaskan Natives are also present at higher percentages than the state average. The FSEIS should determine what the percentage level is for the specific block group (BG) incorporating SQN to determine if it is greater or lesser than the county average. We also note that minority clusters exist near the SQN facility. It would be helpful to include a map depicting the population demographics in relationship to the project location (i.e., 1, 3, 6 miles from the facility).

* EJ Impacts – The DSEIS does not provide adequate baseline information regarding potential for existing EJ issues associated with the facility to make an adequate assessment. For example, the DSEIS indicates that for the license renewal alternative (Alt. 1- page 3-101) the "SQN license renewal would result in no changes in operating employment levels at the plant, and there should be no new impacts to minority and low income populations through this action." While this is encouraging from a license renewal standpoint, it is unclear in the DSEIS what the existing SQN employment levels are like for minority and/or low-income populations or what the existing impacts may be to EJ populations. EPA recommends that any existing EJ impacts – which may have occurred or are ongoing during the 40-year life of the present project licensing – be described in the FSEIS and offset as part of the prospective relicensing.

Moreover, even if no existing EJ impacts exist, the proposed renewal offers an opportunity for TVA to do outreach with minorities, low-income populations and other demographics living near SQN. As a part of the proposed license renewal, we recommend that TVA discuss nuclear power impacts with nearby populations relative to

potential benefits such as job opportunities at SQN or educational possibilities. Periodic dialogue with affected residents regarding the plant should also be provided and the outcome of that dialogue as well as TVA's public involvement process related to specific EJ outreach efforts. Comments and responses to comments should also be summarized in the FSEIS's EJ section.

Fisheries

Page 1-7 states that "SQN operates in a once-through type cooling, normally called the open mode, for the majority of the year, when the cooling tower lift pumps are bypassed" and "[d]uring certain portions of the year, when thermal limit requirements require it, SQN uses a helper mode cooling tower system." Furthermore, page 1-8 states that "[t]he closed-cycle cooling mode is not currently used but can be utilized if needed." We understand that TVA considers Sequoyah an open mode cooling system that uses a helper mode as needed.

While it is clear that portions of the year do not require operation (or only limited operation) of the cooling towers to liberate reactor heat to the atmosphere, we offer that an open or helper mode operation requires much more intake water than a closed system. This could translate into considerably more plankton mortality (e.g., ichthyoplankton (fish eggs and larvae), mollusc and other larvae, and general zooplankton) being entrained within the cooling water system, as well as fish impingement of juvenile and adult fish on the intake screens.

Based on our discussions with TVA, it is our understanding that some 90% of the ichthyoplankton entrained at SQN consists of American shad and that the size of various fish populations in Chickamauga Reservoir, which is under TVA regulation, have been consistent and are in good health. The FSEIS should summarize these fish entrainment studies or estimates.[8] Moreover, unless federal (FWS) and state fish and wildlife counterpart agencies provide concurrence with TVA's entrainment conclusions, we recommend consideration of using the closed-cycle system or greater use of the helper mode. A fallback approach would be to avoiding use of an open system (or helper mode) during known spawning periods and/or varying water intake depth locations to water column depths where eggs and larvae are less prevalent. Additionally, an open system would presumably have a greater and steady thermal discharge – even if controlled by the limits of the NPDES permit – than the occasional thermal discharge of a closed system which could also have a fisheries impact. EPA will defer to the expertise of federal and state fishery agencies regarding final conclusions and recommendations on this matter.

[8] For example: 1) were eggs and larvae enumerated and taxonomically identified or estimated and extrapolated; 2) was there seasonal variation with entrainment and impingement numbers; 3) were rare species included in this study; 4) was the study conducted at a time when the plant operating conditions were representative of today's operating conditions and predicted future operating conditions?

Other Comments

* Reactor Design – The FSEIS (e.g., Sec 1.1) should identify the reactor technology used at SQN, which would not change for the preferred license renewal alternative (Alt. 1), and compare it to the other reactor design(s) available (e.g., AP1000) if the SQN licenses are not renewed and a new nuclear plant alternative (Alt. 2a) was selected and constructed. We understand that a "Westinghouse design" is currently being used at SQN. The FSEIS should clarify.

Similarly, if the existing SQN facility would be relicensed (Alt. 1) and used for power generation for an additional 20 years, would this facility and spent fuel storage area be comparable in its ability to withstanding extreme weather events (tornados, hurricanes, etc.) and terrorist attacks (airplane crash landings, etc.) compared to a new facility with today's design and standards proposed in Alts. 2a and 2b?

* Current and Extended Operational Period – Page 1-29 suggests that if the current 40-year licenses are renewed for an additional 20 years each, that SQN would have reached the end of its life expectancy and be decommissioned. The FSEIS should verify if this 60-year term is still considered reasonable by the NRC and within the industry, and the potential for yet another license extension at SQN for any term.

* ISFSI – Additional dry cask storage for spent fuel rods (i.e., an independent spent fuel storage installation: ISFSI) will need to be operational by 2026 at Sequoyah if relicensing is selected (pg. 3-180). We understand that impacts of increasing the size of the onsite storage building via a concrete pad should "have only minor impacts" (pg. 3-81) and "to result in minimal disturbance to the environment" (pg. 2-16). In a 2002 Environmental Assessment/Finding of No Significant Impact (EA/FONSI), TVA concluded that construction and operation of the original storage site showed no significant impacts. Page 2-16 also states that: "Previous environmental assessments screened 13 potential sites to locate the current ISFSI storage pad, and a similar evaluation would be performed to choose the new additional storage pad location."

Because the need for this related action would occur within the proposed relicensing timeframe (construction start-up expected in 2021), we appreciate that this action was included in the present DSEIS, with some discussion of onsite expansion impacts. We agree that additional NEPA documentation, such as a TVA re-evaluation or a supplemental EA[9], would be needed before 2021 since that storage need is over ten years from now and regulations and policies could change. Moreover, we understand that the NRC re-licensing of this facility is separate from the NRC re-licensing of Unit 1 and 2, so that separate NEPA documentation is appropriate. In contrast, if re-licensing of Units 1 and 2 is not selected by TVA in the present SEIS, there would be no need to expand the existing storage building or construct a new onsite facility since Units 1 and 2 would stop operation before 2026.

[9] EPA requests receipt of a copy of such a NEPA document for review and comment.

In regard to how much additional storage space is needed and within what timeframe, we note that onsite production of tritium for DOE is an option at SQN. Should this be approved and eventuate, a 71% increase in spent fuel would be generated (pg. 3-186). The FSEIS should discuss this in terms of spent fuel storage and possible schedule changes (i.e., would additional storage space already be needed before the projected October 2026 timeframe and 2021 construction startup?).

* Radiological Tritium Monitoring – Page 3-34 states that "An additional groundwater evaluation is planned to further bound tritium concentrations vertically." EPA requests additional discussion on this study in the FSEIS.

* Plant Decommisioning – We appreciate that various methods to decommission SQN and the associated radiological/environmental impacts were considered in Section 3.20 of the DSEIS.